

## CURRICULUM VITAE

### Personal Details:

<b>Family Name:</b> NEILAN	<b>Given Name/s:</b> Brett Anthony
<b>School:</b> Biotechnology & Biomolecular Science	<b>Faculty:</b> Science
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### Academic Qualifications:

Award	Institution	Date Completed
BAppSc (Biochemistry)	University of Technology, Sydney	December, 1985
PhD (Microbial and Molecular Biology)	University of New South Wales	December, 1995

## SUMMARY OF PROFESSIONAL CAREER

Professor Brett Neilan is Deputy Director of the Australian Centre for Astrobiology and Co-Director of the Environmental Microbiology Initiative at The University of New South Wales. As a biochemistry graduate of UTS, Brett trained as a molecular biologist at the University of Adelaide and the Garvan Institute for Medical Research. This training was applied to forensic medicine and human genetics prior to commencement of postgraduate studies for which he obtained a PhD in Microbiology from UNSW in 1995. Postdoctoral studies at Stanford (NASA fellowship) and Humboldt University Berlin (Alexander von Humboldt Fellow) involved the evolutionary history of microbial life in geological structures and the genetics natural products, respectively. Since 1997 he has been a Fellow of the Australian Research Council at UNSW, culminating in the award of a Federation Fellowship in 2008.

Professor Brett Neilan is considered a world leader in the genetics of toxic cyanobacteria (blue-green algae). He has attracted over six million dollars in grants from the Australian Research Council, and more than an equivalent sum from industry and governments both here and overseas. International recognition has been measured by numerous invited reviews, seminars and visiting appointments, including a professorship at the Chinese Academy of Sciences. Nationally his work has been recognised with the award of the Australian Academy of Science Fenner Award in 2004 and the Eureka Prize for Scientific Research in 2001 and Multidisciplinary Research 2005. He has been a member of the executive of the Australian Society for Microbiology (NSW branch), the Australian representative to the International Committee on Toxic Algal Control and head of its monitoring division, and consultant to the federal and state governments on biotechnology and the environment.

His lab currently employs several people, including 6 postdoctoral staff and 4 research assistants, and is training 16 PhD and 3 Honours students, as well as 2 international exchange scientists (having previously trained more than 36 PhD and 25 Honours students, as well as a numerous international exchange scientists and students). Since 1992 he has published more 160 original papers (24 in the past 2 years with another 13 publications under review). Currently, he is engaged in the gene-directed search for natural products from novel microorganisms that are found in traditional medicines and extreme environments. This work has to strengthened networks in China and Thailand, as well as a new relationship with Papua New Guinea. This work is complemented by his ongoing study of the mechanisms involved in non-ribosomal peptide, polyketide and alkaloid biosynthesis of bacterial and algal toxins.

In the past 2 years, Neilan's work has been recognised by two national and one international award, has attracted 9 competitive grants and he has been invited to present at, or organise, 20 conferences.

### **Current Affiliations**

- ARC Federation Fellow, School of Biotechnology & Biomolecular Science, UNSW
- Deputy Director, Australian Centre for Astrobiology, UNSW
- Co-Director, Environmental Microbiology Initiative, UNSW
- Member, Australian Wetlands and Rivers Centre, UNSW
- Member, Sydney Institute for Marine Science

### ***Career History***

2008-	<b>ARC Federation Fellow</b> , School of Biotechnology and Biomolecular Science, UNSW
2005-8	<b>ARC Professorial Fellow</b> , School of Biotechnology and Biomolecular Science, UNSW
2001-5	<b>ARC Research Fellow</b> , School of Biotechnology and Biomolecular Science, UNSW
1998-2000	<b>ARC Postdoctoral Fellow</b> , School of Microbiology and Immunology, UNSW
1996-7	<b>Alexander von Humboldt Fellow</b> , Institute of Genetics, Humboldt University of Berlin
1995-6	<b>NASA Planetary Biology Fellow</b> , Depts of Microbiology and Geology, Stanford University
1992-5	<b>Doctorate Candidate</b> , Microbial and Molecular Biology, UNSW (Research Consultant, Sydney Water)
1990-2	<b>Scientific Officer</b> , Human Genetics, Prince of Wales
1989-90	<b>Senior Research Associate</b> , Pacific Biotechnology
1987-9	<b>Research Associate</b> , Garvan Institute of Medical Research
1987	<b>Forensic Biologist</b> , Division of Forensic Medicine, NSW Dept of Health
1985-6	<b>Research Assistant</b> , Biochemistry, University of Adelaide

## **INDICATORS OF PROFESSIONAL ACHIEVEMENT**

### ***Fellowships and Awards***

CSIRO Division of Fisheries Young Scientist award (1993,1994), Oxford-Nuffield Fellow (Australian Academy of Science nominee, 1994), NASA Planetary Biology Intern (1995), Alexander von Humboldt Foundation Fellowship (1996), Australian Society for Microbiology (Research Trust Award, 1998), US-Environmental Protection Agency travel prize (1998), Kanagawa Museum of Natural History (Australian Academy of Sciences, 1998), ARC Postdoctoral Fellowship (1998), Eureka Prize for Scientific Research (2001), ARC Research Fellowship (2002), Adjunct Professor of the Chinese Academy of Sciences (2002), Alexander von Humboldt Fellowship (2004), Tall Poppy Science Award (Australian Institute for Political Science, 2004), Fenner Medal (Australian Academy of Science, 2004), Walter Burfitt Prize (NSW Royal Society, 2005), ARC Professorial Fellowship (2005), Eureka Prize for Interdisciplinary Science (2005), Australian Academy of Science Korean Fellowship (2006), Australian Society for Microbiology Frank Fenner Research Award (2007), ARC Federation fellowship (2008), Khwarizmi International Fundamental Research Laureate (2009), Australian Museum Eureka Prize for Water Research and Innovation (2009), NSW Scientist of the Year (Environment, Water and Climate Change Sciences category) (2009), University of New South Wales NSi Inventor of the Year (2009 and 2010).

### ***Visiting Appointments***

Scientist-CSIRO Marine Laboratories Hobart (January 1994 and 1995, 2 weeks), Scientist-Wright State University of Ohio (June 1995 and 1996, 2 weeks), Scientist-Scripps Institute for Oceanography (May 1998, 1 week), Scientist-National Institute for Environmental Studies, Tsukuba, Japan (April 1999, 4 weeks), Scientist-Centre for Nuclear Energy and Agriculture, University of Sao Paulo, Piracicaba, Brazil (September 2000, 2 weeks), Scientist-National Institute

for Environmental Studies, Tsukuba, Japan (Feb and Nov 2002, 4 weeks), Professor-Vietnamese National Institute for Biotechnology, Hanoi (September 2002, 2 weeks), Professor-Chinese Academy of Sciences, Institute for Hydrobiology, Wuhan (August 2002, 3 weeks), Professor-Humboldt University of Berlin, Institute for Genetics (July 2004, 3 weeks), Professor-University of Insubria (June 2004, 2 weeks), Professor-University of Ryukus, Marine Station, Okinawa (March 2005, 2 weeks), Professor-University of Seoul (March 2007, 2 weeks), Visiting fellow, Macquarie University Institute for Biotechnology (2007-2010), Chinese Academy of Science (Professor, Institute for Hydrobiology, 2010).

### ***Plenary, Invited Seminars and Conference Organisation***

Stanford University (Medicine, 1996), CSIRO Molecular Sciences (1997), Scripps Institute for Oceanography-San Diego (1998), International Congress on Toxic Cyanobacteria-North Carolina (1998), International Workshop on Toxic Cyanobacteria-Japan (plenary lecturer, 1999), University of Sao Paulo-Brazil (2000), Royal Society for Chemistry, Polyketides III-Bristol (2001), Institute of Biomolecular Science, University of Wollongong (2001), University of Otago (plenary lecturer, 2001), University of Tsukuba (plenary lecturer, Japan, 2002), University of Oslo (Biochemical and Molecular Sciences, August 2002), Chinese Academy of Sciences (Institute for Hydrobiology, Wuhan, August 2002), Vietnamese National Institute for Biotechnology (Hanoi, 2002), Australian Society for Microbiology (symposium lecture and chair, Melbourne, 2002), Japanese National Institute for Environmental Studies (Tsukuba, 2002), American Water Works Association (Seattle, 2002), Asia-Pacific congress on Algal Biotechnology (session chair, Qing Dao, China, 2003), Australian Museum (2004), Organiser of International Toxic Algae Control Symposium workshop on molecular methods for detecting water pathogens, Chiang Mai, 2004 University of Insubria, Italy (2004), Australian Society for Microbiology (scientific committee and symposium chair, 2004), Australian Frontiers of Science symposium, WEHI, Melbourne (2005), National University of Singapore, (2005), US-EPA Cyanotoxin Meeting, North Carolina (committee chair, 2005), NSW Water Research symposium (chair, 2005), Royal Society of NSW (2005, 2006), Science at the Shine Dome, Australian Academy of Science (2005), International Conference on Thermophiles, Gold Coast (2005), International Biosymposium on Microbial Genomes, Seoul (2005), Korean Research Institute Bioscience and Biotechnology, Daejeon (2005), Northern Territory Bio Industry Forum (2006), American Society for Limnology and Oceanography (plenary speaker, 2006), Australian Society of Microbiology (2007), International Toxic Cyanobacteria Conference, Brazil (organising committee and plenary address, 2007), Gordon Research Conference on Mycotoxins and Phycotoxins (2007), Australian Air Pollution Control Association (2007), University of Maryland Institute for Marine Biotechnology (2007), Australian Society for Microbiology (plenary Fenner lecture, 2008), International Society for Microbial Ecology Conference (2008), Invited Lecture, Biotechnology Dept, Iranian Research Organization for Science and Technology, Tehran (February 2009), Invited Lecture, Faculty of New Sciences and Technologies, University of Isfahan (February 2009), Invited Lecture, Inaugural CMU-UNSW Science Symposium, Chiang Mai University (March 2009), Guest Lecture and Workshop on Algal Detection Methods, Charles Sturt University (June 2009), Keynote Lecture, 1<sup>st</sup> National Cyanobacterial Workshop, Parramatta (August 2009), Invited Lecture, Gordon Conference on Mycotoxins & Phycotoxins, New Hampshire (August 2009), Invited Lecture, 6<sup>th</sup> China-Australia Symposium (CAS, ATSE, AAS), Xiamen (October 2009), Plenary Lecture, University of Papua New Guinea Annual Science Symposium, Port Moresby (November 2009), Plenary Lecture, International Symposium on Phycological Research, Varanasi (February 2010), Invited Lecture, School of Medicine and Health Sciences, University of Papua New Guinea, Port Moresby (March 2010), Training Workshop on the Molecular Genetics of Natural Product Biosynthesis, University of Papua New Guinea (March 2010), Second Chiang Mai University/UNSW Science Symposium, Sydney (April 2010), Invited Lecture, Dept Environmental Science, Shanghai Jia Tong University (May 2010), Invited Presentation, Wuxi City Government (May 2010), Local Organising Committee, Genetics of Industrial Microorganisms, Melbourne (July 2010), Tetrodotoxin Science Workshop, Cawthron Institute, Nelson, (August 2010), International Organising Committee, International Conference on Toxic Cyanobacteria, Turkey (September 2010), Keynote Lecture, 9th International Marine Biotechnology Conference, Tsingtao (October 2010), Plenary Lecture, Indonesian Society for Microbiology, Bogor (October 2010).

### ***Editorial Boards***

Toxicon (2006-), Marine Drugs (2007-), World Journal of Biological Chemistry (2009-), Frontiers of Microbiology (2010).

### ***Refereeing***

Invitations for thesis reviews (2 per year, 14 total) and journals (approx 50 per year, total more than 400 to date). Approximately 20 grant applications reviewed annually from national and international agencies including, the National Environmental Research Council, UK (since 1996), CRC for Water Quality (since 1998), ECOHAB, US Dept Commerce (ecology of harmful algal blooms, since 1998), Norway Research Council (since 2000), National Science Foundation, USA (since 2000), National Health and Medical research Council (since 2000), Australian Research Council (Discovery and Linkage Grants, Laureate and Future Fellowships) (since 2001), US- Dept of Energy "genomics for homeland security" (2004), US-Army research section (2004), Australian Museum-Eureka Prizes Judge (2005), South African research council (2006), National Research Foundation (Singapore, 2006), South African research council (2006), German Ministry for Science and Technology (2007), California Sea Grants (2008).

### ***Consultancy and Expert Opinion***

Average of 1 contract per month over the last 5 years. Clients have included Kimberly Clark, News Limited, Caroma, Manildra, and numerous undisclosed private contractors. Expert witness in legal matters on the request of New South Innovations P/L (Unisearch), Sydney Catchment Authority, Sydney Water Corporation, Caroma Industries, Tecra corporation, various law firms, and Orica P/L in the area of public health microbiology. Consultant to US-EPA, South African Water, Japanese government, Australian Academy of Science (High Flyers Think Tank on innovative technical solutions for water management in Australia). Murray River (2009, 2010)/Warragamba Dam (2009) toxic algal bloom events Lake Taihu toxic algal bloom, Wuxi Province advisory committee (2010).

### ***Membership of Scientific Societies***

Member (elect) of the Australian Society for Microbiology and committee member of the NSW branch (2003-6), American Society for Microbiology, Australian Society for Biochemistry and Molecular Biology, American Society for Pharmacognosy, Society for Industrial Microbiology.

### ***Other Professional and Governmental Activities***

Chairman of the OHS committee at the School of Biotechnology and Biomolecular Sciences, UNSW (2000-2003). Coordinator of Postgraduate Studies for the School of Microbiology and Immunology (2001-2002). Deputy Director of the Ramaciotti Centre for Functional Genomics, UNSW (2001-2005). Advisor to the Australian Biotechnology Centres for Excellence selection committee (2001). Head of Environmental and Health Microbiology, UNSW (2003-2005), Senior Associate of the Australian Centre for Astrobiology (2002-), Consultant to NSW Department of Land and Water Conservation on algal blooms and the drought and adviser to the State Minister (Aqualina, 2004), Consult to Sydney Water on detection technology for toxic cyanobacteria (2004-), Consultant to Sydney Catchment Authority on water quality, Adviser on Biotechnology to the Science Adviser (Barlow) for Federal Minister for Science (Nelson, 2005), Member of UNSW International Committee (2005-8), Co-Director of UNSW-Australian Environmental Microbiology Initiative (2007-), Deputy Director of the Australian Centre for Astrobiology (2008-), Member of Dept environment and Heritage's Biodiscovery industry Panel (2006-). Management committee for the Ecology and Evolution Centre (UNSW) NATA accreditation related to genetic testing.

### ***Major Media and Community Involvement***

Sydney Morning Herald (May 2001) - The genetics of toxic algae, Australian Society for Microbiology, annual general meeting dinner speaker (August 2001), Australian Museum Society - Cyanobacteria throughout the ages (February 2002), Mercedes magazine (January 2003)- On the health of Australia's inland water ways, Daily Telegraph (January 2003) - Toxic algae and the drought of 2003, Sydney Morning Herald – Labwatch (Science and Health section, 2003), Advisor

to James Cameron film and IMAX production “Life in the Deep”, Sydney Morning Herald (Good Weekend)-Australian Water Research (2004), Chinese National Television-Research of Australia (2004), Tall Poppy southern Queensland school seminar series (16 lectures, February 2005), Dinner address to Royal Society of NSW and interviewed by Governor General of Australia, Michael Jeffery (March 2005), ABC Radio national interview “Astrobiology and Eureka” (July 2005), Japanese National Broadcaster, feature on Astrobiology (January 2006), Segment on drinking water safety “What’s Good for You” on Channel 9 (July 2006), Sydney Morning Herald, Daily Telegraph, Seven Nightly News, Ten News, ABC Radio on the algal blooms of Warragamba Dam (September 2007), Commentary in *Science* (317, 1166) “Doing battle with the green monster of Taihu Lake” (August 2007), The Australian, Sydney Morning Herald, Radio National on dating the origins of life and biodiversity (May 2008), PBS USA (March 2010) “Bioprospecting in PNG: marine sponges and traditional medicine”, ABC News Aust (April 2010) “Bioprospecting in PNG: marine sponges & traditional medicine”, UNSW TV (July 2010) “Cloning Bush Medicine” A documentary filmed by Professor Neilan’s team while working in PNG.

### RESEARCH FUNDING (1997-2010)

Competitive government funding	\$11,700,000
Industry support (cash)	\$3,850,000
Industry Support (in-kind)	\$6,700,000
TOTAL	\$22,450,000

### Competitive Government Grants (over \$100,000)

- Walter, **Neilan**, George, Summons, Schopf (2010) Oxygenating the Earth: using innovative techniques to resolve the timing of the origin of oxygen-producing photosynthesis in Cyanobacteria. ARC Discovery (\$650,000)
- **Neilan**, Mihali (2010) Determination of the factors responsible for the regulation of cyanobacterial genes to produce toxins. Sydney Catchment Authority (\$187,680)
- Brocks, **Neilan** et al. (2010) Time-of-flight mass spectrometer for analysis of complex mixtures in oils, ancient rocks, recent sediments, natural products and atmospheric aerosols. ARC Linkage Equipment (\$160,000)
- Thordarson, **Neilan** et al. (2010) A Unique Facility for probing soft matter at the molecular level: Characterisation of intermolecular forces and electrochemical processes of single molecules, cells, polymers and electrodes. ARC Linkage (\$600,000)
- Waite, Collins, **Neilan**, Dr Greg Sinclair, Ring (2010) Biogeochemical controls on efficacy and sustainability of uranium heap leaching. ARC Linkage (\$300,000)
- Kellmann, **Neilan**, Døskeland, Birkeland, Zotchev, Fladmark, Jakobsen (FRIBIO, 2009) Saxitoxin biosynthesis and genomics in organisms from two kingdoms - Horizontal gene transfer or parallel evolution? Norwegian Research Council (3,900,000 kroner).
- Dawes, **Neilan** et al. (2009) Advanced high throughput genomics facility for biological, medical, agricultural, environmental and evolutionary research. ARC Linkage Equipment (\$1,130,000)
- Burford, Beardall, **Neilan**, Shaw, Orr (2009) Environmental drivers for production of the toxin, cylindrospermopsin, by cyanobacterium *Cylindrospermopsis raciborskii*. ARC Linkage \$427,000
- **Neilan** (2008-12) The toxins of water-borne cyanobacteria: regulation and exploitation of their biosynthesis. ARC Federation Fellowship (\$1,650,000)
- **Neilan**, Moffitt, Bolch (2008-10) Polyketides as the conserved basis for diverse marine toxin biosyntheses. ARC Discovery (\$315,000)
- McMurtrie, **Neilan**, Eldridge (2008-10) Is reintroduction of soil foraging animals critical for the restoration of degraded semi-arid woodlands? ARC Linkage (\$196,000)
- Stuetz, **Neilan**, et al. (2008) Detection of Trace Concentrations of Chemical Contaminants in Urban Water Systems. ARC Infrastructure (\$490,000)
- Parry, Gibbs, **Neilan** (2008-2010) Management of acid mine drainage in northern Australia using microbial mats. ARC Linkage (\$386,000)
- **Neilan**, Murray, Hallegraeff (2008-10) Uncovering the genetic basis for saxitoxin production in

Australian marine and freshwater systems: novel molecular tools for management. ARC Linkage (\$245,000)

- **Neilan** (2007-9) Methods for the quantitative detection of toxic cyanobacteria and gene regulation. CRC for Environmental Biotechnology (\$180,000)
- **Neilan**, van Asten (2006-8) A sustainable cellular factory for the production of antibiotics by photosynthetic bacteria. ARC Linkage (\$255,000)
- Ingre, **Neilan** (2006-8) The genetic basis for bioactivity in the traditional medicine plants of Australia. ARC Indigenous (\$114,000)
- Suthers, **Neilan** et al. (2006) Sydney Institute for Marine Science, ARC Infrastructure (\$110,000)
- **Neilan**, Jeon, Rogers, Lee (2005-7) Metabolic engineering of *Zymomonas mobilis* for higher value fermentation products. ARC Linkage International (\$116,000)
- **Neilan**, Pomati (2005-2009) Sodium homeostasis and the molecular basis for neurotoxin production by bacteria and algae. ARC Discovery (\$1,000,000)
- Waite, **Neilan**, Furnas, Burford, Rose (2005-7) Mechanisms of iron acquisition by the cyanobacterium *Trichodesmium* in coastal waters. ARC Discovery (\$445,000)
- **Neilan**, Ferguson, Burns (2005-6) Molecular markers for the historical source tracing of faecal contamination of urban water catchments ARC Linkage (\$109,000)
- **Neilan**, van Asten (2002-4) Discovery and genetic engineering of complex biosynthetic pathways from cyanobacteria for the production of novel peptides and polyketides. ARC Linkage (\$165,000)
- **Neilan** (2000-4) Biosynthesis of non-ribosomal peptide toxins in cyanobacteria: A functional characterization of microcystin synthetase. ARC Discovery (\$460,000)
- Hirose, Sunairi, **Neilan** (2003-6) Evolution and symbiosis of the ascidian associated cyanobacterial genus *Prochloron*. Japanese Science and Technology Agency (\$270,000)
- **Neilan**, Saint (2003-2006) Molecular basis for anatoxin production, American Water Association Research Foundation (\$160,000)
- **Neilan**, Ashbolt (2003-2006) Tracking and fate of pathogens in the catchment. Sydney Catchment Authority (\$240,000)
- **Neilan** (1997-2007) Genetics of cyanobacterial toxin biosynthesis. CRC for Water Quality (\$981,000)
- **Neilan** (1997-1999) Nonribosomal peptide synthesis and microcystin production. ARC Discovery (\$200,000)

### Industry Support

Sydney Water Corporation, Sydney Catchment Authority, NSW Dept Land and Water Conservation, NSW Dept Primary Industries, NSW Dept Fisheries, NSW Food authority, SA dept Primary Industries, Tasmanian Dept Health, NT Dept Primary Industries, NT Dept Business and Development, Diagnostic Technology P/L, Australian Biofilters, DOW Chemicals, BASF, NSW Dept Environment, Sembcorp.

### RESEARCH MENTORSHIP 2009-2010

Course	Number of Students	Number Completed
PhD	21 (46)	5 (31)
Masters by research thesis	1 (5)	1 (3)
Honours projects	10 (43)	8 (40)
Practicum exchange students	3 (37)	3 (37)
Summer students (Faculty and CRC for Water Quality)	6 (34)	6 (34)
Postdoctoral advisor	6 (9)	0 (3)

NB. Numbers in parentheses are career total

### **PUBLICATION SUMMARY (1994 – 2010)**

Category	A	B	C	D	E	F	G	H	I
Career total	162	8	0	18	8	8	8	0	190

**Itemised according to the following categories (A-I):**

- A Papers, notes, communications, reviews, etc in refereed journals or other publications of eminence in the discipline
- B Refereed published conference or symposium papers
- C Books
- D Chapters in books
- E Any other published work
- F Patents
- G State, national and international government reports
- H Other (including university) reports
- I Unpublished conference papers or other public presentations such as workshops or seminars

**PUBLICATION LIST CAN BE SUPPLIED ON REQUEST**